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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,908	07/03/2003	Shyh-Chin Huang	134495-1	7212

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GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER
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WYSZOMIERSKI, GEORGE P

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/613,908

Applicant(s)

HUANG ET AL

Examiner

George P. Wyszomierski

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 11, 16, 29 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-15, 21-28 and 31-37 is/are rejected.
- 7) ☒ Claim(s) 17-20, 30, 39 and 40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/3/03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

Art Unit: 1742

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-10, 12-15, 17-28, 30-37, 39 and 40, drawn to a method, classified in class 75, subclass 335.
- II. Claims 11, 16, 29 and 38, drawn to a composite product, classified in class 148, subclass 400.

2. The inventions are distinct, each from the other because:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another, materially different process such as by in-situ precipitation of nano-sized phases in a metallic structure.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their different classification and recognized divergent subject matter, restriction for examination purposes as indicated is proper.

3. During a telephone conversation with Paul DiConza, attorney of record on September 21, 2005 a provisional election was made with oral traverse to prosecute the invention of Group I, claims 1-10, 12-15, 17-28, 30-37, 39 and 40. Affirmation of this election must be made by applicant in replying to this Office action. Claims 11, 16, 29 and 38

Art Unit: 1742

are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Kawabe et al. Shizuoka Journal Abstract.

Kawabe discloses forming a structure which includes nano-size SiC particles in an Al alloy matrix. This structure is formed by uniformly dispersing fine SiC particles in a molten metal matrix by using the vortex method. With respect to instant claim 2, the method disclosed in the Kawabe abstract does not appear to result in any substantive change in the quantity, chemistry, or size of the SiC particles. The Abstract does not use the term "convection vortex", and does not specify rotating a container to create such a vortex. However, the examiner is taking the term "vortex method" in Kawabe to be the full patentable equivalent of the claimed "convection

vortex". With respect to rotating, any movement of the container which would necessarily occur in the Kawabe process in order to carry out a "vortex method" is held to be equivalent to the rotating step presently claimed. Thus, a prima facie case of obviousness is established between the disclosure of Kawabe et al. and the presently claimed invention.

7. Claims 1, 2, 3, 6, 8, 9, 21, 22, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO 00/37241.

The WIPO document discloses forming a composite material including a nanosize reinforcement as set forth in claims 3 or 22 in a molten matrix, by cooling a rotating cavity containing the molten matrix material and powders of the reinforcement. With respect to instant claim 2, the method disclosed in WIPO '241 does not appear to resulting any substantive change in the size, quantity, or chemistry of the reinforcement material. With respect to instant claims 6, 8, 21 and 26, the sides of the rotating cavity in the '241 reference are stated to be a mold, and the final material produced therein appears to be a near net shape product. With respect to instant claims 9 and 27, the WIPO disclosure is directed to the production of automobile parts, which may clearly require some physical alteration to properly fit a particular vehicle. With respect to instant claim 21, while the drawing figure of the prior art depicts a container rotating on a horizontal axis, this container is mounted on a movable mechanism **26** that can tilt, which would result in rotation about a vertical axis in accord with the instant claims.

The prior art does not use the term "convection vortex". The examiner's position is that the rotation of the container used in the '241 process will cause a physical mixing and moving of the molten material and the reinforcement in such a manner that convection occurs and a vortex created. Thus, the process as recited in the instant claims is held to be not patentably distinguishable from that as disclosed by WIPO '241.

8. Claims 1-10, 12-15, 21-28 and 31-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angeliu et al. (U.S. Patent 6,251,159).

Angeliu discloses forming a composite material including nanophase particles in a metal matrix, by mixing and dispersing the nanophase particles in a metallic melt by convection mixing; see Angeliu column 4, lines 47-50. With respect to instant claim 2, the method disclosed by Angeliu does not appear to resulting any substantive change in the size, quantity, or chemistry of the nanophase particles. The particles and the matrix material may be the same as those of instant claims 3, 4, 22, 23, 32 and 33; see Angeliu column 3, lines 19-39. With regard to instant claims 5, 24 and 34, the examiner's position is that use of the same materials and process steps would result in an equivalent grain structure in either the prior art or the claimed process. With respect to instant claims 6-10 and 21-28, Angeliu column 5, lines 19-30 indicates that the particles will remain suspended in the metallic melt until solidification, and the melt can then be processed by physical working steps into a large article such as a rotor for a steam turbine. With respect to instant claims 12-15, 31, and 35-37, this act of processing the molten material including the nanophase particles into a large casting, as disclosed by Angeliu column 5, line 22, at least suggests the limitations regarding solidifying in flight as recited in these claims.

Angeliu does not specify rotating the container in order to cause the convection vortex, as required by the instant claims. This difference is not seen as resulting in a patentable distinction between the prior art and the claimed invention because Angeliu column 4, lines 47-55 indicates that the manner of mixing the particles into the matrix is not critical, and may include using a stirrer, electromagnetic mixing, and the use of physical mixing devices. This at least suggest rotating the container, as done in the presently claimed process.

Consequently, a prima facie case of obviousness is established between the disclosure of Angeliu et al. and the presently claimed invention.

9. Claims 1-10, 12-15, 21-28 and 31-37 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 6,939,388 in view of Angeliu et al. The '388 claims define a process of making a nanocomposite material including a dispersion of nano-sized material within a solid matrix by solidifying a molten material having the nano-sized material added thereto. The '388 claims do not recite the convection vortex as required by the instant claims, i.e. the '388 claims agitate the molten material using ultrasonic energy in order to disperse the nano-sized material within the molten material. Angeliu '159 column 4, lines 47-55 indicates convection mixing to be a known equivalent to electromagnetic stirring, in the art of forming composites including nanoparticles in a melt. Thus, it would have been an obvious expedient to employ the convection vortex as presently claimed as a mixing step in the process as claimed in the '388 patent.

10. Claims 17-20, 30, 39 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose or suggest pressurizing the container as required by the instant claims.


Art Unit: 1742

11. The remainder of the art cited on the attached PTO-892 and 1449 forms is of interest. This art is held to be no more relevant to the claimed invention than the art as applied in the rejections, supra.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Wyszomierski whose telephone number is (571) 272-1252. The examiner can normally be reached on Monday thru Friday from 8:00 a.m. to 4:30 p.m. Eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on (571) 272-1244. Effective July 15, 2005, all patent application related correspondence transmitted by facsimile must be directed to the new central facsimile number, (571)-273-8300. This new Central FAX Number is the result of relocating the Central FAX server to the Office's Alexandria, Virginia campus.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
GEORGE WYSZOMIERSKI  
PRIMARY EXAMINER  
GROUP 1700

GPW

September 27, 2005